इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 4103 (1977): metal nesting chairs- Specification [CED 35: Furniture]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 4103 - 1977

Reaffirmed 2010

Indian Standard

SPECIFICATION FOR METAL NESTING CHAIRS

(First Revision)

UDC 684·432·124·044

© *Copyright* 1977

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

[illegible] Gr 2

November 1977

(*Continued from page* 1)

Members	*Representing*
Shri R. D. Srivastava	Central Building Research Institute (CSIR), Roorkee
Shri T. N. Gupta (*Alternate*)	
Shri L. G. Toye	Research, Designs & Standards Organization, Lucknow
Shri V. K. Punj (*Alternate*)	
Shri N. Venkataraman	The Western India Plywoods Ltd, Cannanore District (Kerala)
Shri K. Venugopal (*Alternate*)	
Shri D. Ajitha Simha, Director (Civ Engg)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri S. P. Maggu
Assistant Director (Civ Engg), ISI

Panel for Metal Furniture, BDC 35 : P1

Convener	
Shri S. Balakrishnan	Ministry of Defence
Members	
Shri S. A. Pawaskar (*Alternate* to Shri S. Balakrishnan)	
Shri G. N. Gidwani	Directorate General of Supplies & Disposals, New Delhi
Shri Gopal Ramnarayan	Featherlite Corporation, Bangalore
Shri Baldev Ramnarayan (*Alternate*)	
Shri R. E. Jambhekar	Godrej & Boyce Mfg Co Pvt Ltd, Bombay
Dr P. A. Joshi (*Alternate*)	
Shri J. A. Panchal	National Institute of Designs, Ahmadabad
Shri H. K. Vyas (*Alternate*)	
Shri Ashok C. Patel	Chandan Metal Products Pvt Ltd, Vadodara
Shri Arun C. Patel (*Alternate*)	
Shri P. B. Sheth	Ahmedabad Eagle Engineering Enterprises Pvt Ltd, Ahmadabad
Shri B. L. Sheth (*Alternate*)	

AMENDMENT NO. 1 DECEMBER 1979
TO
IS : 4103 - 1977 SPECIFICATION FOR METAL NESTING CHAIRS

(First Revision)

Alterations

(*Page* 7, *clauses* **6.1.1**, **6.1.2** *and* **6.1.3**) — Substitute the following for the existing clauses:

"**6.1.1** All dents, burrs and sharp edges shall be removed from various components. The components shall be individually pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign matter.

6.1.2 Immediately after pickling, all the mild steel parts shall be given phosphating treatment conforming to Class C of IS : 3618-1966*. The process for application of phosphate coating shall be in accordance with IS : 6005-1970 'Code of practice for phosphating of iron and steel'.

NOTE — Putty shall be applied to all the surfaces requiring filling and shall conform to IS : 426-1961†. Aluminium primer shall conform to IS : 2931-1964‡.

6.1.3 Coat/coats of enamel paint shall then be applied as follows:

a) Finish coat with enamels conforming to IS : 151-1950**, IS : 2932-1974|| or IS : 2933-1975¶; and

b) In case of stoving enamel the components shall thereafter be baked at a specified temperature in an oven heated uniformly. The finish shall be smooth and uniform with a hard and tough film of enamel strongly adhering to the surface. The finish shall be free from all visible defects and shall not chip when tapped lightly with a dull pointed instrument."

Addenda

(*Page* 8, *clause* **6.4**) — Add the following new clauses after **6.4** and renumber the subsequent clauses accordingly:

"7. PERFORMANCE REQUIREMENTS OF FINISH

7.1 Scratch Hardness Test — A sample of mild steel plate 150 × 50 mm in size and thickness 0·315 mm and finished as given in **6** shall be subjected to scratch hardness test in accordance with **15.1** of IS : 101-1964 'Methods of test for ready mixed paints and enamels (*second revision*)'. A scratch, showing the bare metal shall not be produced on the test sample.

7.2 Pressure Test — Samples prepared from mild steel plates of thickness 0·315 mm and finished as given in **6** shall be subjected to pressure test in accordance with **15.2** of IS : 101-1964. The metal surface shall not be rendered visible when the test pieces are separated after the test.

7.3 Flexibility and Adhesion Test — A sample of mild steel plate 150 × 50 mm in size and thickness 0·315 mm and finished as given in **6** shall be subjected to flexibility and adhesion test in accordance with **16** of IS : 101-1964. The paint film on the test piece shall not show damage, detachment or cracking when examined under × 10 magnification.

7.4 Stripping Test — A sample of mild steel plate 150 × 50 mm in size and thickness 0·315 mm and finished as given in **6** shall be subjected to stripping test in accordance with **17** of IS : 101-1964. The scratch produced after the test shall be free from jagged edges.

7.5 Test for Protection Against Corrosion Under Conditions of Condensation — A mild steel panel of size 150 × 100 mm and thickness 1·25 mm and finished as given in **6** shall be subjected to test for protection against corrosion under conditions of condensation in accordance with **18** of IS : 101-1964. The metal surface shall show no signs of corrosion after the test."

(BDC 35)

Printed at New India Printing Press, Khurja, India

Indian Standard
SPECIFICATION FOR METAL NESTING CHAIRS
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 31 May 1977, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first published in 1967. In this revision, besides stoving enamel the use of air drying enamels has also been allowed for the finish of mild steel components.

0.3 This standard contains clauses **3.3**, **6.2** and **6.4** which permits the purchaser to use his option for selection to suit his requirements and clause **9.1** which requires the purchaser to supply some technical information at the time of placing orders.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for materials, sizes, construction and finish of metal nesting chairs.

2. MATERIALS

2.1 Electrodes and Filler Rods — Electrodes and filler rods for gas, arc and spot welding shall conform to IS : 1278-1972†, IS : 814 (Part I)-1974‡, IS : 814 (Part II)-1974§ and IS : 4972-1968||.

---

*Rules for rounding off numerical values (*revised*).

†Specification for filler rods and wires for gas welding (*second revision*).

‡Specification for covered electrodes for metal arc welding of structural steel : Part I For welding products other than sheets (*fourth revision*).

§Specification for covered electrodes for metal arc welding of structural steel : Part II For welding sheets (*fourth revision*).

||Specification for resistance spot-welding electrodes.

2.2 Mild Steel Sheets — Mild steel sheets shall conform to IS : 513-1973* or IS : 1079-1973†.

2.3 Mild Steel Tubes — Mild steel tubes shall conform to IS : 7138-1973‡.

2.4 Aluminium Sheets — Aluminium sheets shall conform to H_8 condition of Designation 31000 or 52000 of IS : 737-1974§.

2.5 Aluminium Tubes — Aluminium tubes shall conform to Designation 62400, 63400 or 65032 of IS : 1285-1975||.

2.6 Screws — Screws shall conform to IS : 1365-1968¶.

2.7 Wood — The wood suitable for furniture making as specified in IS : 399-1963** shall be used.

3. FABRICATION

3.0 Components — Metal nesting chairs shall be assembled from the components given in **3.1** to **3.3**.

3.1 Tubular Frame — The frame shall be made from mild steel tubular pipe with a wall thickness of not less than 1·2 mm or from aluminium tubular pipe with a wall thickness of not less than 2·0 mm and 25 mm outside diameter. The aluminium tubular pipe may be square in cross section in the same dimensions.

3.1.1 *Ends of Tubes* — The bottom ends of chair legs shall be provided with caps made of metal, plastic, rubber or other resilient material which will not mar floor and is resistant to sliding. The caps or shoes and the ends of the tubes shall be so fabricated that cutting or shearing during usage of the chair will be held to minimum. The top ends of the rear legs shall be plugged or covered with caps of a similar material as used for the bottom ends.

3.2 Seat — The seat shall be fabricated from a single piece of mild steel sheet not less than 1 mm thick or from aluminium sheet not less than 1·6 mm thick or from BWR grade plywood not less than 5 mm thick conforming to IS : 303-1974†† and shall be formed in such a manner as to provide comfort,

---

*Specification for cold rolled carbon steel sheets (*second revision*).

†Specification for hot rolled carbon steel sheets and strip (*third revision*).

‡Specification for steel tubes for furniture purposes.

§Specification for wrought aluminium and aluminium alloys, sheet and strip (for general engineering purposes) (*second revision*).

||Specification for wrought aluminium and aluminium alloy, extruded round tube and hollow sections (for general engineering purposes) (*second revision*).

¶Specification for slotted countersunk head and slotted raised countersunk head screws (dia range 1·6 to 20 mm) (*second revision*).

**Classification of commercial timbers and their zonal distribution (*revised*).

††Specification for plywood for general purposes (*second revision*).

strength and rigidity and eliminate sharp edges. Seats may also be made out of wooden battens or planks not less than 10 mm thick. Stiffeners may also be provided under the seat where necessary. The seat may also be padded or canned.

3.3 Backrest — The backrest shall not be less than 150 mm high and shall be fabricated from a single piece of mild steel sheet not less than 1 mm thick or from aluminium sheet not less than 1·6 mm thick or from BWR grade plywood (*see* IS : 303-1974*) not less than 5 mm thick, to form a comfortable fitting shape. All edges shall be formed to provide maximum strength to the back. There shall be no sharp exposed edges. The backrest may also be padded or canned and shall be made foldable if so desired by the purchaser.

4. ASSEMBLY

4.1 Design — The structural design of chairs shall be such that any sustained and impact weight will be uniformly distributed on all supporting parts with no excessive strain on any one or pair of supporting parts under normal usage and no defect or damage is caused when stacked. When in use, the chair shall not collapse due to a shift in weight of the user.

4.2 The various components shall be assembled by means of riveting, bolting or welding.

4.3 The method of gas welding, arc welding and spot welding shall conform to IS : 1323-1966†, IS : 816-1969‡ and IS : 819-1957§ respectively.

4.3.1 Welding of aluminium parts shall be in accordance with IS : 2812-1964‖.

5. DIMENSIONS

5.1 Dimensions of chairs shall be as given in **5.1.1 to 5.1.3** (*see* Fig. 1).

5.1.1 *Seat Height from Floor* — The height of seat of chair shall be 430 ± 5 mm (*see* Note).

NOTE — The Sectional Committee has been considering the question of height of chairs for quite sometime and the general consensus seems to be that it is no longer desirable to have the present 455 mm high chairs now in vogue and that it should be less, specially for nesting chairs.

---

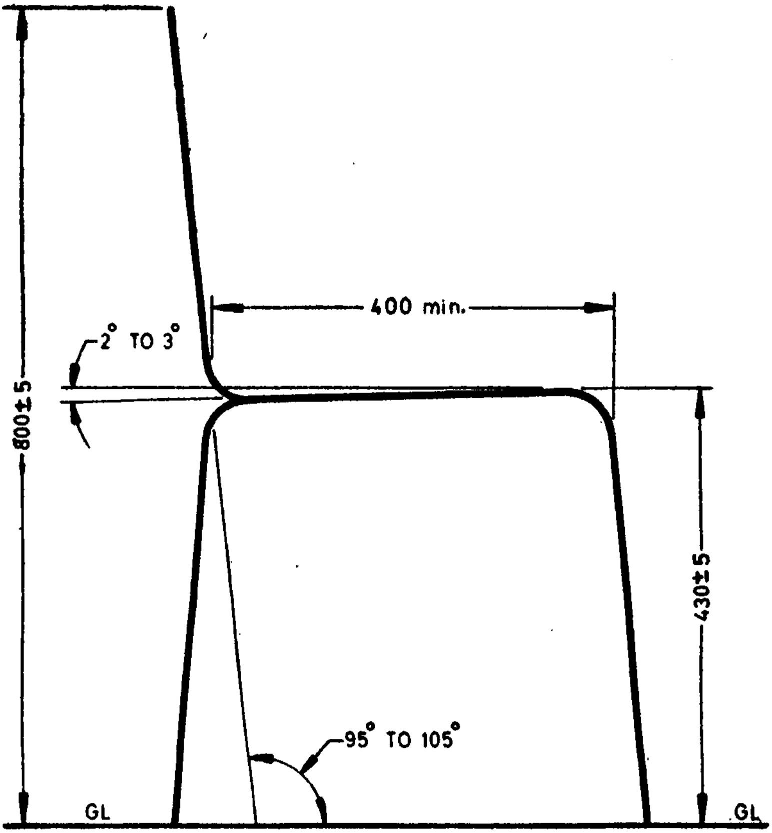
*Specification for plywood for general purposes (*second revision*).

†Code of practice for oxy-acetylene welding for structural work in mild steel (*revised*).

‡Code of practice for use of metal arc welding for general construction in mild steel (*first revision*).

§Code of practice for resistance spot welding for light assemblies in mild steel.

‖Recommendations for manual tungsten inert-gas arc-welding of aluminium and aluminium alloys.



All dimensions in millimetres.

FIG. 1 TYPICAL NESTING CHAIR

5.1.2 *Width of Seat* — The minimum width of seat shall be 400 mm measured at a point midway along the effective depth of the seat.

5.1.3 *Effective Depth of Seat* — Minimum effective depth of seat shall be 400 mm. This shall be measured from a vertical line through the centre of the front edge of the seat to a vertical line through the centre of the back edge of the seat.

5.2 The overall dimensions of the nesting chair shall be as given below:

a) Overall height	800 ± 5 mm
b) Overall width	450 ± 5 mm

6. FINISH

6.1 Mild Steel Components

6.1.1 All dents, burrs and sharp edges shall be removed from various mild steel components and they shall be pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign matter. Components made out of tubular pipe shall be chemically cleaned to remove grease, rust, scale or any other foreign matter.

6.1.2 After pickling the sheet components shall be given phosphating treatment in accordance with IS : 3618-1966* followed by a coat of suitable primer, such as red oxide. The tubular components immediately after chemical cleaning shall be given a coat of suitable primer, such as red oxide.

NOTE — Putty shall be applied to all surfaces requiring filling and shall conform to IS : 426-1961†. Aluminium primer shall conform to IS : 2931-1964‡.

6.1.3 Two coats of enamel paints shall then be applied as follows:

a) Undercoat conforming to IS : 149-1950§, IS : 2932-1975|| or IS : 2933-1975¶.

b) Finish coat with enamels conforming to IS : 151-1950**, IS : 2932-1975|| or IS : 2933-1975¶, and

c) In case of stoving enamel the components shall thereafter be baked at a specified temperature in an oven heated uniformly. The finish shall be smooth and uniform with a hard and tough film of enamel strongly adhering to the surface. The finish shall be free from all visible defects and shall not chip, when tapped lightly with a dull pointed instrument.

6.2 Aluminium Components — Aluminium components may be anodized if required by the purchaser. The anodic coating shall not be less than Grade AC15 of IS : 1868-1968††.

6.3 Wooden Components — The wooden components shall be polished with wax polish or transparent glossy French polish or stained dark and polished or lacquered or shall have epoxy or melamine finish.

---

*Specification for phosphate treatment of iron and steel for protection against corrosion.

†Specification for paste filler for colour coats (*revised*).

‡Specification for ready mixed paint, brushing, aluminium-zinc oxide composite primer.

§Specification for ready mixed paint, spraying, undercoating, stoving, for enamels and general purposes, colour as required.

||Specification for enamel, synthetic, exterior (a) undercoating, (b) finishing (*first revision*).

¶Specification for enamel, exterior (a) undercoating, (b) finishing (*first revision*).

**Specification for ready mixed paint, spraying, finishing, stoving, enamel, for general purposes, colour as required.

††Specification for anodic coatings on aluminium (*first revision*).

6.4 All components shall be finished in colour as agreed to between the purchaser and the manufacturer.

7. PACKING

7.1 All the component parts shall be packed in such a way that no damage is caused to them during transit.

8. MARKING

8.1 All metal nesting chairs shall be marked with a suitable mark identifying the manufacturer.

8.1.1 The metal nesting chairs may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9. INFORMATION TO BE SUPPLIED BY THE PURCHASER

9.1 The purchaser shall supply the following information to the supplier along with the order:

a) Colour and finish, and

b) Where alternative methods of construction and finish are specified they shall be clearly stated in the order.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

INDIAN STANDARDS INSTITUTION
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephone : 27 01 31 (20 lines) **Telegrams : Manaksanstha**

Regional Offices:

			Telephone
Western	: Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern	: 5 Chowringhee Approach	CALCUTTA 700072	23-08 02
Southern	: C.I.T. Campus, Adyar	MADRAS 600020	41 24 42

Branch Offices:

' Pushpak ', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
' F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
606 Shaheed Nagar	BHUBANESHWAR 751007	5 36 27
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017	2 83 20
5-8-56/57 L. N. Gupta Marg	HYDERABAD 500001	22 10 83
D-277 Todarmal Marg, Banipark	JAIPUR 302006	7 63 16
117/418 B Sarvodaya Nagar	KANPUR 208005	82 72
B.C.I. Bldg (3rd Floor), Gandhi Maidan East	PATNA 800004	5 36 55
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at Delhi Printers, Delhi, India